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# Evaluation of process indicators of the prenatal and birth humanization program and stork network

## Avaliação dos indicadores de processo do Programa de Humanização no Pré-Natal e Nascimento e da Rede Cegonha

## Evaluación del programa de humanización de indicadores de procesos en prenatal y nacimiento y red cigüeña

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## ABSTRACT

**Objective:** To analyze the process indicators of the Prenatal and Birth Humanization Program (PBHP) and the Stork Network from the prenatal information system. **Method:** This is an epidemiological descriptive study, based on secondary prenatal information system data from a municipality in the South-eastern region of Brazil. The prenatal care indicators were analyzed using the process indicators of the PBHP, the Stork Network and the Ministry of Health's Technical Manual for Low- Risk Prenatal Care and then they were evaluated in four levels of quality, being classified as adequate, inadequate and intermediate. **Results:** It was verified that the quality of prenatal care was classified as unsatisfactory for all levels. **Conclusion:** Constant interventions for the management are needed in order to improve the quality of prenatal care.
**Descriptors:** Prenatal Care; Health Assessment; Health Care Quality.

## RESUMO

**Objetivo:** Analisar os indicadores de processo do Programa de Humanização no Pré-Natal e Nascimento (PHPN) e da Rede Cegonha a partir do sistema de informação de pré-natal. **Método:** Trata-se de um estudo epidemiológico descritivo, baseado em dados secundários do sistema de informação de pré-natal de um município da região Sudeste do Brasil. Os indicadores da assistência pré-natal foram analisados utilizando-se os indicadores de processo do PHPN, da Rede Cegonha e do Manual Técnico da Atenção ao Pré-Natal de Baixo Risco do Ministério da Saúde (MS), e, em seguida, foram avaliados em quatro níveis de qualidade, sendo classificados em adequada,

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inadequada e intermediária. **Resultados:** Verificou-se a classificação da qualidade da assistência pré-natal insatisfatória para todos os níveis. **Conclusão:** São necessárias intervenções constantes pela gestão para melhoria da qualidade da assistência pré-natal.

**Descritores:** Cuidado pré-natal, Avaliação em saúde, Qualidade da assistência à saúde.

### RESUMEN

**Objetivo:** Analizar los indicadores de proceso del Programa de Humanización del Prenatal y Nacimiento (PHPN) y la cigüeña red de sistema de información prenatal. **Métodol:** Se trata de un estudio epidemiológico descriptivo, basado en los datos del sistema de información prenatal secundaria a partir de un municipio de la región sureste de Brasil. Los indicadores de atención prenatal se analizaron mediante los indicadores de proceso los PHPN, la Red Cigüeña y Atención al Manual Técnico prenatal Ministerio de Salud Bajo Riesgo y luego fueron evaluados en cuatro niveles la calidad de ser clasificado como adecuado, inadecuado e intermedio. **Resultados:** No hubo clasificación de la calidad de la atención prenatal satisfactoria para todos los niveles. **Conclusión:** Se necesita intervenciones constantes de la gestión para mejorar la calidad de la atención prenatal.

**Descriptores:** La atención prenatal, Evaluación de la salud, La calidad de la asistencia sanitaria.

## INTRODUCTION

Prenatal care comprises a set of cares and procedures during pregnancy in order to preserve the health of the mother and the baby, ensuring prevention and health promotion with early detection of complications and timely and appropriate treatment of maternal diseases inherent to the gestation. In addition, it aims to prepare the pregnant woman for childbirth and the puerperium.[1]

In order to guarantee adequate prenatal and puerperal assistance to the mother/child binomial, the Ministry of Health (MH) established the Prenatal and Birth Humanization Program (PBHP)[2], which aimed to develop actions for the promotion, prevention and health care of pregnant women, newborns and women in the puerperal period. This program has as priorities the reduction of the rates of maternal and perinatal morbidity and mortality in the country, as well as the adoption of measures to ensure improved access, coverage and quality of prenatal care, delivery, puerperium and the neonatal period as guaranteed citizenship rights.[2]

After 10 years, in order to reinforce and reaffirm this policy, the MH launched, in 2011, the Stork Network Program, which aims to promote the implementation of a new health care model for women and children with a focus on the birth, growth and development of the child from 0 to 24 months. This program also aims to organize the Maternal and Infant Health Care Network so as to guarantee access, shelter, resolution and reduction of maternal and infant mortality, with emphasis on the neonatal component.[3]

The PBHP/Stork Network brings a logic of regionalization and hierarchization of the Unified Health System (UHS), which has been established as an instrument for organizing and structuring reference networks for the care of pregnant women in the municipalities. It is based on the norms that the humanization of obstetric and neonatal care are prerequisites for adequate prenatal, childbirth and puerperium follow-up, ensuring improved access, coverage and follow-up of this assistance in the perspective of citizenship rights.[4-5]

Furthermore, in order to support Basic Care teams in the qualification of prenatal care, the MH publishes Technical Manuals for Low-Risk Prenatal Care, being the last publication in the year 2012[6]. This Technical Manual presents the latest scientific evidence, from the organization of the work process, to the planning, follow-up of the normal-risk pregnancy and its possible complications, health promotion, pregnancy in special situations, childbirth care, and establishes minimum criteria to be followed during prenatal care.[2-3,5]

However, after sixteen years of PBHP and five of the Stork Network, the low achievement of the proposed goals remained, with rates of compliance with all the minimum requirements recommended below 10%, as evidenced by studies in the State of Espírito Santo Microregion,[6] in the municipalities of Juiz de Fora (MG) and state of Minas Gerais,[7] in the municipalities of Rio de Janeiro (RJ)[8] and Vitória (ES).[9]

On the other hand, evaluating the quality of the information produced by the care provided to the mother/child binomial is indispensable insofar as they are important instruments for the diagnosis of the health situation, since they distinguish populations of greater vulnerability, they allow to plan therapeutic strategies according to the needs and specificities of each population group by pointing out the risk factors for maternal and neonatal morbidity and mortality.[10]

The purpose of this article is to analyze the process indicators of the Prenatal and Birth Humanization Program (PBHP) and Stork Network from the prenatal information system.

## METHOD

This is a descriptive-epidemiological study based on the analysis of secondary data from a prenatal information system.

The population of the study consisted exclusively of pregnant women who underwent prenatal care at the Basic Health Units (BHU) and at the Municipal Specialty Center (MSC) in the city of Vitória (ES) and had their attendance registered at the clinic of the *Bem Estar* Network (BEN), with the first prenatal visit between January 1, 2013 and December 31, 2014, and completion of prenatal care until October 2014. The database was provided by the Sub-Secretariat of Information Technology (SUBIT) at October and November 2015. The pregnant women who had their prenatal follow-up interrupted at the BEN were excluded from the study. After applying the inclusion and exclusion criteria, 5030 clinical records of prenatal care were analyzed, representing 56% of live births in the period under investigation.

As of January 2013, all prenatal consultations began to be filled out in the BEN Prenatal Clinical Record. For this reason, this evaluation period was used.

The municipality has its own electronic medical record network, known as *Bem Estar* Network (BEN), completely replacing the paper in medical records. The system aims at the management, planning, control, evaluation and

operationalization of actions and services of the Municipal Health Department (MHD).[11] Within the electronic medical record, there is a specific record for the registration of all prenatal care, including the registration of the pregnant woman at the first visit and follow-up at subsequent visits, until the puerperal consultation. It is an online service tool, called the Prenatal Clinical Record, adapted from the Brazilian Federation of Gynecology and Obstetrics Societies (FEBRASGO), which acts as a systematized completion guide for use throughout prenatal care, allowing more precise data collection and systematized service among professionals. It is also a source of information for registration in the Sisprenatal web of the Ministry of Health, but also in the evaluation of the process indicators of the Program for Humanization of Prenatal and Birth (PBHP) (2000) and Stork Network (2011) of the Ministry of Health (MH).[2-3]

The indicators of prenatal care were analyzed based on the process indicators of the PBHP, Stork Network and Technical Manual for LowRisk Prenatal Care of the MH.[2-3,5] Prenatal care was then divided into four levels of quality: adequate, inadequate and intermediate categories suggested by Anversa *et al*.,[12] according to the levels of minimum procedures performed for each pregnant woman, described in Chart 1 and 2.

**Chart 1** - Prenatal quality indicators assessed at level 1 and 2

| CATEGORY | LEVEL1 |
|---|---|
| Adequate | BEN Registration ≥ 6 visits and beginning of prenatal up to 12 weeks of gestation |
| Inadequate | BEN Registration at the beginning of prenatal care after 28 weeks of gestation or up to three visits |
| Intermediate | Other situations |
| **Category** | **LEVEL 02 (level 1 + level 2)** |
| Adequate | BEN Registration ≥ 6 visits, prenatal start up to 12 weeks, ≥ 5 records of the technical procedures of weight, AP, UFA; ≥ 4 FCB records, fetal presentation, fetal movements, and edema survey in lower limbs |
| Inadequate | BEN Registration ≤ 3 visits or beginning of prenatal care after 28 weeks of gestation or ≤ 2 records of technical procedures: weight, AP, UFA, FCB, fetal presentation, fetal movements and edema survey in lower limbs |
| Intermediate | Other situations |

Source: Brasil[2-3,5]; Anversa *et al*.[12]

**Chart 2** - Prenatal quality indicators assessed at level 3 and 4

| CATEGORY | LEVEL 03 (level1 + level 3) |
|---|---|
| Adequate | BEN Registration≥ 6 prenatal consultations, prenatal start up to 12 weeks gestation, minimum recommended laboratory test records: blood type/Rh factor test, toxoplasmosis and ultrasound (USG), ≥ 2 records Of EAS tests, fasting glycemia, Hb, Ht, HbsAg, anti-HIV, uroculture, VDRL |
| Inadequate | BEN Registration at the beginning of prenatal care after 28 weeks of gestation or ≤ 3 visits or no registration of the exams |
| Intermediate | Other situations |
| **CATEGORY** | **LEVEL 04 (level 1 + level 2 + level 3)** |
| Adequate | BEN Registration ≥ 6 prenatal consultations, prenatal start up to 12 weeks gestation, ≥ 5 records of technical procedures: weight, PA, AFU; ≥ 4 FCB records, fetal presentation, fetal movements and edema survey in lower limbs; A registry of blood type /Rh factor tests, toxoplasmosis, USG, ≥ 2 EAS test scores, fasting glycemia, Hb, Ht, HbsAg, anti-HIV, uroculture, VDRL; Registry of anti-tetanus vaccines *, hepatitis B *, influenza, collective activity, dental consultation, and puerperal consultation |
| Inadequate | BEN Registration of the beginning of the prenatal period after 28 weeks of gestation or ≤ 3 consultations, or ≤ 2 records of the technical procedures: weight, AP, UFA, FCB, fetal presentation, fetal movements and edema survey or no registration of the exams |
| Intermediate | Other situations |

Source: Brasil[2-3,5]; Anversa *et al*.[12].
*It was not possible to evaluate doses of tetanus and hepatitis B vaccines because the registry does not qualify the type of dose.

A descriptive statistical analysis was performed using absolute frequency (N) and percentage (%). The research project was approved by the Research Ethics Committee of the Federal University of Espírito Santo, on July 5, 2015, under No. 1,138,587.

## RESULTS AND DISCUSSION

The analysis of the process indicators of the PBHP/Stork Network from the prenatal information system included 5030 BEN Prenatal Clinical Records completed during the follow-up of pregnant women in the years of 2013 and 2014 in the BHU and MSC in the municipality of Vitória (ES), corresponding to approximately 56% of the estimated number of live births for the municipality in these two years (average annual estimate of 4,500 live births).[13]

Table 1 shows the adequacy of prenatal care classified in the four levels of quality proposed by Anversa *et al*.,[12] according to the minimum procedures recommended by the PBHP/Stork Network and Technical Manual for Low Risk Prenatal Care performed for each pregnant woman attended and registered in the prenatal information system through the BEN Prenatal Clinical Record.

**Table 1** - Adequacy of prenatal care in the four levels of quality in the city of Vitória/ES, 2014.

| Adequacy | N | % |
|---|---|---|
| **Level 1** | | |
| Adequate | | |
| BEN Registration≥ 6 visits and beginning of prenatal up to 12 weeks of gestation | 759 | **15.09** |
| Inadequate | | |
| BEN Registration at the beginning of prenatal care after 28 weeks of gestation or up to three visits | 1800 | 35.79 |

| Adequacy | N | % |
|---|---|---|
| Intermediate<br>Other situations | 2471 | 49.13 |
| **Level 2 (level 1 + level 2)** | | |
| Adequate<br>BEN Registration ≥ 6 visits, prenatal start up to 12 weeks, ≥ 5 records of the technical procedures of weight, AP, UFA; ≥ 4 FCB records, fetal presentation, fetal movements, and edema survey in lower limbs | 577 | **11.47** |
| Inadequate<br>BEN Registration ≤ 3 visits or beginning of prenatal care after 28 weeks of gestation or ≤ 2 records of the technical procedures: weight, AP, UFA, FCB, fetal presentation, fetal movements and edema survey in lower limbs | 3041 | 60.46 |
| Intermediate<br>Other situations | 1412 | 28.07 |
| **Level 3 (level 1 + level 3)** | | |
| Adequate<br>BEN Registration ≥ 6 prenatal consultations, prenatal start up to 12 weeks gestation, minimum recommended laboratory test records: a blood type/Rh factor test, toxoplasmosis and ultrasound (USG), ≥ 2 records of EAS tests, fasting glycemia, Hb, Ht, HbsAg, anti-HIV, uroculture, VDRL | 167 | **3.32** |
| Inadequate<br>BEN Registration at the beginning of prenatal care after 28 weeks of gestation or ≤ 3 visits or no registration of the exams | 2118 | 42.11 |
| Intermediate<br>Other situations | 2745 | 54.57 |
| **Level 4 (level 1 + level 2 + level 3)** | | |
| Adequate<br>BEN Registration ≥ 6 prenatal consultations, prenatal start up to 12 weeks gestation, ≥ 5 records of technical procedures: weight, AP, UFA; ≥ 4 FCB records, fetal presentation, fetal movements and edema survey in lower limbs; A registry of blood type/Rh factor tests, toxoplasmosis, USG, ≥ 2 EAS test scores, fasting glycemia, Hb, Ht, HbsAg, anti-HIV, uroculture, VDRL; Registry of anti-tetanus vaccines*, hepatitis B*, influenza, collective activity, dental consultation, and puerperal consultation | 8 | **0.16** |
| Inadequate<br>BEN Registration at the beginning of the prenatal period after 28 weeks of gestation or ≤ 3 consultations, or ≤ 2 records of the technical procedures: weight, AP, UFA, FCB, fetal presentation, fetal movements and edema exams | 3359 | 66.78 |
| Intermediate<br>Other situations | 1663 | 33.06 |

Source: *Bem Estar* Network.

Prenatal care was classified as adequate for 15.09% at level 1; 11.47% at level 2; 3.32% at level 3; and 0.16% at level 4. At levels 1 and 3, it was found that the majority presented intermediate adequacy, being 49.13% and 54.57%, respectively. For levels 2 and 4 it was observed that the majority had inadequate adequacy, with values greater than 60%.

According to the parameters of the PBHP/Stork Network, the process indicators of prenatal care were considered completely adequate, when they reach level 4, for only 0.16% of the pregnant women attended.

The analysis of the process indicators of the PBHP/Stork Network from the prenatal information system presented an unsatisfactory quality adequacy for all levels. The lack of registration or incomplete data of the system makes it difficult to assess the information and, consequently, the assistance provided.

Most of the pregnant women presented less than 6 prenatal consultations, a result inferior to that found in the previous studies in Vitória (ES)[9] and Microregion of Espírito Santo[6], which were 75.6% and 69% respectively, and similar to the study developed in the metropolitan region of Vitória[15], which verified that 48.2% of the pregnant women performed more than 7 prenatal consultations. Different from the recommended by the Ministry of Health, the number of prenatal consultations of this municipality is below that recommended for most of the pregnant women attended.

The onset of prenatal care also presented an unsatisfactory adequacy. Another study also conducted in Vitória (ES)[9] observed that 38% started prenatal care up to 12 weeks. When grouping the two indicators and incorporating level 1, the prenatal adequacy was classified as intermediate quality, below that recommended by the Ministry of Health. In the study in Rio de Janeiro,[8] 25% of the pregnant women started prenatal care after the fourth month of gestation and, when evaluating the beginning until up to 12 weeks, the value of inadequacy rises to 50% of pregnant women. In Juiz de Fora and Minas Gerais, prenatal onset up to 14 weeks in 2002 was 29.7% and in 2004 it was 51.5%[7].

A study carried out in developed countries described that having many or few consultations does not influence the completion of prenatal care. However, in medium- to low-developing countries, the increase in perinatal mortality is more often found among women with few prenatal consultations.[15]

The evaluation of the procedures individually presented better indexes, reaching registration values above 50% ; being in agreement with the recommendations described in the Low Risk Prenatal Care Technical Manual,[5] which indicate the measurement of AP as a grade C recommendation; the height of the uterine fund has grade B recommendation; the FCB has grade C recommendation; the fetal movements, grade C recommendation; And research on edema in MMII has grade C recommendation.

In the evaluation of level 3, which includes level 1 plus laboratory tests, the majority presented intermediate quality, and similar findings were found in another study that also

evaluated the process indicators of the PBHP and Stork Network in the Microregion of Espírito Santo.[6] On the other hand, when assessing the exams performed at least once, some of them reach more than 70%, in agreement with the results of the study conducted in Vitória (ES)[9], which also found values higher than 70%. The best result found was for VDRL (74%), and in repetition, fasting blood glucose reached 55%. The accomplishment of the minimum laboratory tests recommended during prenatal care is an opportune moment for the prevention and treatment of diseases that can affect the mother/child binomial, in relation to avoidable causes for the reduction of maternal and neonatal morbimortality.[5]

When assessing the quality of prenatal care at level 4 as appropriate, only 0.16% presented all minimum criteria recommended for complete prenatal care. A similar result is found in the studies in the Microregion of Espírito Santo,[6] in the city of Juiz de Fora and Minas Gerais,[7] Rio de Janeiro[8] and Vitória (ES),[9] which presented less than 10% adequacy.

When evaluating the parameters separately, within each level, they present better adaptations in some variables, as presented in Table 2.

**Table 2** - Distribution of the parameters of the PBHP/Stork Network in the city of Vitória - ES, 2014.

| Variable | N | % |
|---|---|---|
| **Level 1** | | |
| ≥ 6 prenatal consultations | 2259 | 44.91% |
| ≤ 6 prenatal consultations | 2771 | 55.09% |
| ≤ 12 weeks of gestation | 1456 | 28.95% |
| ≥ 12 weeks of gestation | 3574 | 71.05% |
| **Level 2** | | |
| ≥ 5 Records of technical procedures | | |
| Weight | 2635 | 52.39% |
| AP | 2676 | 53.20% |
| UFA | 2237 | 44.47% |
| ≥ 4 Records of technical procedures | | |
| Fetal presentation | 2229 | 44.31% |
| Fetal movements | 2661 | 52.90% |
| FCB | 2793 | 55.53% |
| Edema survey in lower limbs | 2553 | 50.76% |
| **Level 3** | | |
| 1 Registration of laboratory tests | | |
| EAS | 3503 | 69.64% |
| Fasting blood glucose | 3127 | 62.17% |
| Hb/Ht | 3612 | 71.81% |
| HbsAg | 3567 | 70.91% |
| HIV | 3640 | 72.37% |
| Toxoplasmosis | 3443 | 68.45% |
| Uroculture | 3464 | 68.87% |
| VDRL | 3730 | 74.16% |
| Ultrasonography | 3538 | 70.34% |
| Blood type/Rh factor | 3509 | 69.76% |
| ≥ 2 Registration of laboratory tests | | |
| EAS | 1679 | 33.38% |
| Fasting blood glucose | 2812 | 55.90% |
| Hb/Ht | 1664 | 33.08% |
| HbsAg | 1374 | 27.32% |
| HIV | 1588 | 31.57% |
| Toxoplasmosis | 1249 | 24.83% |
| Uroculture | 1635 | 32.50% |
| VDRL | 1790 | 35.59% |
| **Level 4** | | |
| 1 Influenza vaccine registry | 805 | 16.00% |
| ≥ 1 Collective activity record | 278 | 5.53% |
| ≥ 1 Dental consultation | 2560 | 50.89% |
| Puerperal consultation | 1698 | 33.76% |

Source: *Bem Estar* Network

At level 1, 55.09% of the pregnant women presented less than 6 prenatal visits, while 44.91% had more than 6 visits. At level 2, the technical procedures evaluated separately presented more than 50% for weight, AP, fetal movements, FCB and edema survey. At level 3, the recommended minimum laboratory tests presented more than 60% for at least once performed, with a better fit for Hb/Ht that reached more than 70% in the registries. However, when evaluating above two records for the recommended tests, only fasting blood glucose reached 50%, the rest of the tests presented around 30%. At level 4, only the dental appointment presented more than 50% for at least 1 consultation.

The dental appointment recorded in the BEN Prenatal Clinical Record reached 50.89% at least once. This demonstrates that the pregnant women are looking for the dental service within the BHU. In the study in the Metropolitan Region of Big Vitória, Espírito Santo[16], 11.7% of the women interviewed received adequate dental care. In the study in Araçatuba/SP,[17] of the 100 pregnant women interviewed, 73% answered that they did not seek the dental surgeon, compared to 27% who sought it. In the latter group, beliefs and myths were evidenced by pregnant women as a reason for not seeking dental care during pregnancy.

The last item evaluated was the puerperal consultation, which was performed in 33.76% of the pregnant women followed up. Similar results are found in the studies in Porto Alegre, Rio Grande do Sul,[18] in which 16.8% of the pregnant women performed the puerperal consultation. Another research, also in municipality of Southern Brazil, [12] found that 48% returned to the puerperium consultation and, in São Carlos, São Paulo,[19] did not exceed 48,6%.

The quality of prenatal care in general presented an unsatisfactory adequacy at all levels, evidencing the fragility of services and gaps in the work process. Considering that the municipality of Vitória has a 75% coverage of Family Health Strategy and in addition to the Program of Community Health Agents, it has 85.70%[13-20], it is necessary to reflect on the organization of prenatal care in the municipality.

In addition, there is the possibility of procedures being performed and not recorded or recorded and not performed.[14] Underreporting of data recorded by professionals has been pointed out in the literature as the main limitation in studies of this type[12,21-22], which contributes to unsatisfactory results.

## CONCLUSION

The study after analyzing the process indicators of the PBHP/Stork Network from the prenatal information system presented an unsatisfactory quality adjustment for all the parameters recommended by the Ministry of Health. It showed predominance of intermediate adequacy levels at levels 1 and 3 and inadequate levels 2 and 4.

This study shows the fragility of services and the gaps in the work process. It is suggested to supervise and systematically control the quality of prenatal care, as well as the awareness raising and training of professionals.

It is necessary to make constant active searches to the pregnant women and puerpera through home visits for early capture and reduction of absence to the consultations, as well as the humanized reception of care.

The PBHP/Stork Network is a reference policy in the Brazilian territory. However, municipalities need to organize themselves to effectively implement this policy as a duty of the State and the right of citizenship.

The results can contribute to direct and reformulate strategies aimed at improving the quality of prenatal care indicators, as well as providing a tool for municipal management to invest in the reorganization of prenatal care in the municipality.

There is a limitation in the study concerning the information system evaluated, because in the previous study on the data quality of the same system, it presented poor and very poor results of incompleteness for most of the variables, except for the auto-complete fields and mandatory for the care completeness. So it may not display the reality of the services.

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